### IEEE P802.11 Wireless LANs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11be D1.0 CR for 4.5.3 | | | | |
| Date: 2021-08-30 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Po-Kai Huang | Intel Corporation | 2200 Mission College Blvd, Santa Clara, CA 950542200 |  | po-kai.huang@intel.com |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Abstract

This submission proposes resolutions for the following CIDs:

4094, 4130, 4131, 4302, 4804, 5069, 5229, 5575, 5576, 5577, 5891, 5892, 6115, 6116, 6160, 6161,

6180, 6749, 7020, 7400, 7401, 7403, 7404, 7502, 7503, 7504, 7505, 7506, 7507, 7508, 7509, 7510,

7562, 7877, 8254, 8255, 8256, 6111, 6113

Revisions:

* Rev 0: Initial version of the document.
* Rev 1: Add 6111
* Rev 2: Add 6113

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGbe D1.0 Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGbe D1.0 Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGbe Editor: Editing instructions preceded by “TGbe Editor” are instructions to the TGbe editor to modify existing material in the TGbe draft. As a result of adopting the changes, the TGbe editor will execute the instructions rather than copy them to the TGbe Draft.***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **Clause** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 4094 | Abhishek Patil | 4.5.3.3 | 46.65 | Clarify this is referring to non-AP MLD. | Change "MLD" to "non-AP MLD". There are many such such instances in clause 4 that need to be updated to "non-AP MLD" (e.g., 3 instances on pg 47). | Revised –  "MLD" has been changed to "non-AP MLD" in the commented sentence.  Other instances have been fixed.  TGbe editor, no further changes are needed to address this comment. |
| ML transition description | | | | | | |
| 4130 | Alfred Asterjadhi | 4.5.3.2 | 46.43 | Is transition from an ML state to a STA state still an ML transition? Please clarify | As in comment. | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| 4131 | Alfred Asterjadhi | 4.5.3.2 | 46.48 | Not certain where this "fast ML transition" is defined. Is it a feature or just a statement of a transition that is fast? I assume that the text here is a derivative of copy paste from Fast BSS Transition being defined above but that would be incomplete. Either clarify or remove. | As in comment. | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| 5069 | Gaurav Patwardhan | 4.5.3.2 | 46.48 | Missing detail for MLDs to use "Fast ML transition". | Include and extend Clause 13 (Fast BSS Transition) from baseline 802.11-2020 spec to include MLO. | Revised –  Description of ML transition has been merged with BSS transition. There is no need to have additional fast ML transition  TGbe editor, no further changes are needed to address this comment. |
| 6160 | Michael Montemurro | 4.5.3.2 | 46.38 | There is no such thing as fast ML transition and there doesn't need to be. An non-AP MLD can transition to another AP MLD or an AP that is part of the same ESS. The only rules that need to be clarified is that it shall use the AP MLD MAC address when it transitions to the AP. | Remove the cited sentence (p45, l38-49) and modify the next sentence as follows: At 46.29, Change "This type is defined as a STA movement from one BSS in one ESS to another BSS within the same ESS. A fast BSS transition is a BSS transition that establishes the state necessary for data connectivity before the reassociation rather than after the reassociation." to "This type is defined as a STA movement from one BSS in one ESS to another BSS within the same ESS. For MLO, an MLD movement from an AP MLD to another AP MLD within the same ESS, or another AP within the same ESS."  At 48.33, Delete "/ML" | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| 7502 | Tomoko Adachi | 4.5.3.2 | 46.48 | "fast ML transition" does not appear independently elsewhere in the draft. It is as though combined with fast BSS transition and expressed as "FT" but "FT" accronym definition is not changed in 3.4 and such clarifiation is needed in 4.5.3.2. | As in comment. | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| 7562 | Tomoko Adachi | 9.4.1.5 | 109.52 | "For ML transition, if the current association is between a non-AP STA and an AP, then the Current AP Address field is the MAC address of the AP with which the STA is currently associated." From the definition of the non-AP MLD, the case when a non-AP MLD is associated with an AP should be also covered. | Change it to read "For ML transition, if the current association is between a non-AP STA or a non-AP MLD and an AP, then the Current AP Address field is the MAC address of the AP with which the STA or the non-AP MLD is currently associated." | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| 5892 | Liangxiao Xin | 4.5.3.2 | 46.41 | d) ML-transition 1) could be moved to b) BSS-transition | same as in the comment | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| 5575 | John Wullert | 4.5.3.2 | 46.46 | For consistency among bullet items, use "within the same ESS" | Modify final text in item 3 in list to "within the same ESS" | Revised –  The cited phrase is in the description of ML transition, which has been merged with BSS transition.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 5575. |
| 5576 | John Wullert | 4.5.3.2 | 46.21 | Text describes three transitions, but now there are at least four | Update text to reflect correct number of transitions (there are four high level and the ML-transition has three variants, so number could be 4 or 6) | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| 6749 | Romain GUIGNARD | 4.5.3.2 | 46.21 | The number of transition types has been changed from three to four | Change three to four | Revised –  Description of ML transition has been merged with BSS transition.  TGbe editor, no further changes are needed to address this comment. |
| “a” “an” Editiroal fix. | | | | | | |
| 4840 | Dmitry Bankov | 4.5.3.4 | 47.40 | Wrong article: "an STA" in many places throughout the document | Change to "a STA" | Revised –  We do the editorial fix.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 4840. |
| 5229 | Ilya Levitsky | 4.5.3.3 | 33.18 | Change all occurancies of "an STA" to "a STA" | As in comment | Revised –  We do the editorial fix.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 4840. |
| 7020 | Sigurd Schelstraete | 4.5.3.5 | 48.52 | Typo. Change "in an STA" to "in a STA" | See comment | Revised –  We do the editorial fix.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 4840. |
| 7508 | Tomoko Adachi | 4.5.3.3 | 47.40 | "Once an STA or MLD association is completed, ...". For the term "STA", indefinite "a" is used. | Change it to read "Once a STA or MLD association is completed, ...". | Revised –  We do the editorial fix.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 4840. |
| 7510 | Tomoko Adachi | 4.5.3.5 | 48.53 | "... by either party in an STA association ... or a MLD association ...". For the term "STA", indefinite "a" is used, while "an" is used for "MLD". | Change it to read "... by either party in a STA association ... or an MLD association ...". | Revised –  We do the editorial fix.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 4840. |
| Other CIDs | | | | | | |
| 5577 | John Wullert | 4.5.3.3 | 47.38 | The frequent use of "respectively" makes the text here very hard to read. Suggest breaking each of the sentences in these paragraphs into two, one describing the original AP/STA releationship and one describing AP MLD/non-AP MLD relationship. | For example: "At any given instant, a STA is associated with no more than one AP. Similarly, a non-AP MLD is associated with no more than one AP MLD. This allows the DS to determine a unique answer to the question, "Which AP is serving STA X?" or "Which AP MLD is serving non-AP MLD Y?"... | Revised –  The texts has been revised to have separate sentences for STA or MLD.  TGbe editor, no further changes are needed to address this comment. |
| 5891 | Liangxiao Xin | 4.5.3.2 | 46.33 | Is there a non-AP MLD movement from a BSS in one ESS to a BSS in a different ESS? | modify c) ESS-transition accordingly | Rejected –  Inter-ESS transition does not have specific protocols for STA in the baseline. Search ESS transition in the baseline only has two instances, which are all about intra-ESS transition. |
| 6161 | Michael Montemurro | 4.5.3.3 | 47.21 | The 802.1X port applies to the AP MLD and non-AP MLD. | change: "(STA association) or multiple IEEE 802.11 links (MLD association)" to "(STA association) or two MLDs (multi-link setup)" | Revised –  The cited sentences has been revised as follows.  *“Within a robust security network (RSN), association is handled differently. In an RSNA, the IEEE 802.1X Port determines when to allow data traffic across an IEEE 802.11 link between two STAs or multiple IEEE 802.11 links between two MLDs(#2263).”*  TGbe editor, no further changes are needed to address this comment. |
| 6180 | Michael Montemurro | 4.5.3.4 | 48.17 | Within the ESS is important in this case. Even MLDs can only perform BSS Transitions within an ESS. | Change "STA or between AP MLD and non-AP MLD" to "STA or between AP MLD and non-AP MLD within the ESS" | Rejected-  “In an ESS” has been emphasized at the beginning of the sentence.  *“In an ESS with a DS, the reassociation service informs the DS of the current mapping between AP and STA*  *or between AP MLD and non-AP MLD”* |
| 7400 | Stephen McCann | 4.5.3.2 | 20.45 | typo "STAs" | The term MLD needs to be added. Change the word "STAs" to "STAs or MLDs". | Revised –  We assume that the commenter means 46.20.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 7400. |
| 7401 | Stephen McCann | 4.5.3.3 | 46.65 | At P46L65, the text mentions "IEEE 802.11 STA or MLD". However, at P47L5, the text mentions "a STA or a non-AP MLD". Therefore, within this clause, there appears to a mix of equivalent terms. Sometimes an MLD is a STA, but at others a non-AP MLD is a STA. | There probably needs to be an architectural discussion about this, to determine the correct terminology. Otherwise, all occurances of STA in the draft should be matched with MLD and non-AP STA matched with non-AP MLD. | Revised –  We change the description of STA in the context of connecting to AP as non-AP STA.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 7401. |
| 7403 | Subir Das | 4.5.3.2 | 46.43 | During ML-transition, when a non-AP MLD becomes a non-AP STA and reassociates with an AP, it is not clear whether this non-AP STA is an EHT non-AP STA or a legacy non-AP STA. Similarly, whether the AP (where non-AP STA reassociates with) is a legacy AP or not. In addition, it is not clear when MLD disassociation happens or MLD disassociation is required or not. | As in comment | Rejected -  The text does not specify those restrictions so both EHT or legacy are allowed unless specified otherwise.  MLD disassociation is initiated when disassociation frame is sent by affiliated AP of an AP MLD or affiliated non-AP STA of a non-AP MLD.  Based on the current spec definition of reassociation service, you do not need to send disassociation frame of the previous association. This is defined in the reassociation procedure of 11.3. |
| 7404 | Subir Das | 4.5.3.2 | 46.45 | During ML-transition, when a non-AP STA associated with an AP becomes a non-AP MLD that is associated with an AP MLD, it is not clear whether this non-AP STA is an EHT non-AP STA or a legacy non-AP STA. Similarly, whether the AP (where non-AP STA associated with) is a legacy AP or not. In addition, it is not clear when MLD association happens. | As in comment | Rejected -  The text does not specify those restrictions so both EHT or legacy are allowed unless specified otherwise.  To be a STA part of an MLD, you have to be an EHT STA. MLD is not defined for non-EHT.  MLD association is initiated when Association Request frame including ML element is sent. |
| 7503 | Tomoko Adachi | 4.5.3.3 | 47.10 | The case when a non-AP MLD becomes associated with an AP MLD is described. Looking at the definition of non-AP MLD in 3.2, even if it is associated with an AP at one of its STAs, it is still a non-AP MLD. So, the case when a non-AP MLD becomes associated with an AP should be also described. Although it may be obvious, it is worhwhile to show it can associate with an AP. | Add "For a non-AP MLD, the act of becoming associated with an AP invokes the association service (STA association), which provides the non-AP MLD to AP mapping to the DS. For this case, the non-AP MLD is treated as a STA." | Rejected –  Non-AP MLD does not associated with an AP. Non-AP MLD associates with an AP MLD. |
| 7504 | Tomoko Adachi | 4.5.3.4 | 48.05 | It should cover the case when a non-AP MLD from one AP to another. | Change it to read "a current STA association (see 4.5.3.3 (Association)) of a non-AP STA or a non-AP MLD from one AP to another | Rejected –  Non-AP MLD does not associated with an AP. Non-AP MLD associates with an AP MLD. |
| 7505 | Tomoko Adachi | 4.5.3.4 | 48.07 | MLD association is described in 4.5.3.3 and 35.3.5.1. | Add "(see 4.5.3.3 (Association) and 35.3.5.1 (Multi-link (re)setup procedure))" after "MLD association". | Revised –  We cite 4.5.3.3 and 11.3 for appropriate clause.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 7505. |
| 7506 | Tomoko Adachi | 4.5.3.4 | 48.09 | STA association is described in 4.5.3.3 and MLD association is described in 4.5.3.3 and 35.3.5.1. | Add "(see 4.5.3.3 (Association))" after "STA association" and add "(see 4.5.3.3 (Association) and 35.3.5.1 (Multi-link (re)setup procedure))" after "MLD association". | Revised –  We cite 4.5.3.3 and 11.3 for appropriate clause.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 7505. |
| 7507 | Tomoko Adachi | 4.5.3.4 | 48.12 | 35.3.5.1 does not especially explain the reassociation from MLD association to STA association case. | Add "(see 4.5.3.3 (Association) and 35.3.5.1 (Multi-link (re)setup procedure))" after "MLD association" and add "(see 4.5.3.3 (Association))" after "STA association". Delete "(see 35.3.5.1 (Multi-link (re)setup procedure))." at the end of the column. | Revised –  We cite 4.5.3.3 and 11.3 for appropriate clause.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 7505. |
| 6111 | Mark Hamilton | 35.3.5.1 | 254.52 | The term "MLD association" is never defined. Where it is introduced, in the 4.5.3.3 Association high-level description subclause, it says to see 35.3.5.1, but this phrase never appears in 35.3.5.1. Add the connection to the phrase. | Add a new first sentence, "Multi-link setup is an association or reassociation between a non-AP MLD and AP MLD, also known as an MLD association." Also add defintiions of MLD assocaition and STA association in clause 3. | Revised -  We change the reference to 11.3, and put it after MLD association.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 6111. |
| 6113 | Mark Hamilton | 35.3.5.1 | 255.19 | "the act of becoming associated with an AP MLD invokes the association service (MLD association), which provides the non-AP MLD to AP MLD mapping to the DS" promises that this is explained in 35.3.5.1. There is no mentiond of how this mapping is provided to the DS in 35.3.5.1 (only a mention that the affiliated non-AP STAs and APs are \_not\_ so mapped). Also, with no changes to clause 7, the DS SAP has no mechanism to provide it with such mapping. | In addition to saying what is \_not\_ provided to the DS, this paragraph should describe that the non-AP MLD to AP MLD mapping \_is\_ provided to the DS. Clause 7's DS DAP must be enhanced to add the concept of MLD mappings. This includes the SAP support for managing this mapping, explaining how the DSAF is archtecturally connected to the AP MLD structures in clause 7 and 5.1.5.3, and how the new structure maps to/provides the services in 4.5 (and probably other clause 4 subclauses). | Revised -  We change the reference to 11.3, and put it after MLD association.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 6111. |
| 7509 | Tomoko Adachi | 4.5.3.5 | 48.45 | "For a non-AP MLD, the act of becoming disassociated invokes the disassociation service, which voids any existing non-AP MLD to AP MLD mapping known to the DS, for the disassociating non-AP MLD (see 35.3.5.3 (Multi-link tear down procedure))." A non-AP MLD can associate with an AP. | Change it to read "For a non-AP MLD, the act of becoming disassociated invokes the disassociation service, which voids any existing non-AP MLD to AP MLD or AP mapping known to the DS, for the disassociating non-AP MLD (for the disassociating non-AP MLD with an AP MLD, see 35.3.5.3 (Multi-link tear down procedure))." | Rejected –  Non-AP MLD does not associated with an AP. Non-AP MLD associates with an AP MLD. |
| 8255 | Yuxin LU | 4.5.3.2 Mobility types | 46.45 | For 3) 'A non-AP STA being associated with one AP' and 'a non-AP MLD being reassociated with an AP MLD' are two very different scenarios. I am not sure it is necessary to define this as a mobility type. | As in comment | Rejected –  It is possible that in the enterprise scenario, say a floor of a building beling to a company, only some places have upgraded to Wi-Fi 7 MLD due to budget constraint. As a result, transition between MLD and legacy AP is a scenario that needs to be addressed. |
| 8256 | Yuxin LU | 4.5.3.2 Mobility types | 46.42 | For 2) 'A non-AP STA being associated with one AP' and 'a non-AP MLD being reassociated with an AP MLD' are two very different scenarios. I am not sure it is necessary to define this as a mobility type. | As in comment | Rejected –  It is possible that in the enterprise scenario, say a floor of a building beling to a company, only some places have upgraded to Wi-Fi 7 MLD due to budget constraint. As a result, transition between MLD and legacy AP is a scenario that needs to be addressed. |
| 7877 | Yongho Kim | 4.5.3.3 | 47.38 | According to the text, it is not clear if the each STA affiliated with non-AP MLD can be associated with the same legacy AP using the legacy association (This case also allows the DS to determine a unique answer to the question, "Which AP is serving STA X?") | Add clear statement that each STA in non-AP MLD cannot perform legacy association with AP(including the same legacy AP case) | Rejected –  We already have the following normative behavior in 11.3.5.2 that prevents this case.  *For a non-AP MLD associated with an AP MLD, a non-AP STA affiliated with the non-AP MLD shall not*  *send an Association Request frame without Multi-Link element* |
| 8254 | Yuxin LU | 4.5.3.2 Mobility types | 46.42 | For 2), the text is not informative. There are more than one STA on a non-AP MLD. When a non-AP MLD moves to become a non-AP STA, what happens to the other non-AP STAs affiliated to this non-AP MLD? We need to specify some requirements/conditions for this ML-transition. | As in comment | Revised -  The previous association does not exist anymore, which is the only thing that we need to specify, and the affiliated STAs of the MLD then does not have any specific spec requirement anymore. Also, the commenter assumes that the STA is one of the previous affiliated STA. This may not be the case. For example, the MLD MAC address may not be the same as any of the affiliated STA, so when you move to legacy AP, you need to have another STA with MAC address equal to the MLD MAC address.  The confusion is likely due to the missing text on MAC address requirement. The revised text in D1.1 already specifies the requirement on MAC address.  TGbe editor, no further changes are needed to address this comment. |
| 4302 | Alfred Asterjadhi | 4.5.3.3 | 0.00 | Instead of adding MLD in every occurrence of STA in these subclauses I think it is simpler to add a sentence in the beginning of the main subclause that in the case of MLO the STA refers to the MLD. Same consideration for reassoc, and deassoc. | As in comment. | Rejected –  The suggested texts will not work for the elaboration of transition between entities under BSS transition.  This will also create confusions of “one BSS” for AP MLD and non-AP MLD, which is not correct.  Add a general sentence as suggested, and add different exception across does not present the concept better.  Finally, we note that separate description and elaboration on MLD has been done across architecture and security, and the short cut of just saying “STA refers to the MLD” is the direction that is adopted in other part of the spec. |
| 6116 | Mark Hamilton | 4.5.3.2 | 32.20 | How does a non-AP MLD "become" a non-AP STA (and vice-versa)? Is this transition specified anywhere? Is this a new instantiation (presumably not, since this is trying to talk about reassociation)? So what is it? What changes? What doesn't change? | This transition to/from MLD-ness needs to be explained and detailed. | Revised -  We use the term “be” rather than “become” in D1.1.  The do the transition to an legacy AP and have a STA association, you simply send a Reassocaition request frame without ML element with TA equal to the MLD MAC address.  The confusion is likely due to the missing text on MAC address requirement. The revised text in D1.1 already specifies the requirement on MAC address.  TGbe editor, no further changes are needed to address this comment. |
| 6115 | Mark Hamilton | 4.5.3.2 | 32.16 | Cart before the horse: the purpose of clause 4.5.3.2 is to introduce concepts and build up to the concepts of association or reassociation which are introduced next. The mobility concepts here (in 4.5.3.2) are to help describe and understand what association and reassocation mean. To use the terms associated and reassociated within this subclause both defeats the purpose, and creates a logical circularity in this introduction of these basic concepts. | Options: 1) Make changes along the lines proposed in another comment to remove the "affiliated station" concept in the concept of MLD, in which case these changes can just be removed as unnecessary; or 2) Reword these additions to use only the concept of "movement from one BSS to another BSS", and clarify the concept of "becoming" (in some cases) either an MLD or STA/AP. | Revised -  Reassociation description is already provided in 4.5.3.4.  TGbe editor to make the changes shown in 11-21/1425r2 under all headings that include CID 6115. |

**Discussion:** *None.*

**Propose:**

**4.5 Overview of the services**

**4.5.3 Connectivity-related services**

**4.5.3.1 General**

***Change the first paragraph as follows:***

The primary purpose of a MAC sublayer is to transfer MSDUs between MAC sublayer entities. The information required for the distribution system service to operate is provided by the association services. Before an MSDU can be handled by the distribution system service a STA or an MLD is “associated.”

**4.5.3.2 Mobility types**

***Change the first paragraph as follows:***

The three transition types of significance to this standard that describe the mobility of STAs or MLDs(#7400) within a network are as follows:

* + - * + ***No-transition:*** In this type, two subclasses that are usually indistinguishable are identified:

Static—no motion.

Local movement—movement within the PHY range of the communicating STAs, i.e., movement within a basic service area (BSA).

* + - * + ***BSS-transition:*** This type is defined for a STA or an MLD as follows:
* ~~a~~A STA movement from one BSS in one ESS to another BSS within the same ESS.
* A non-AP MLD movement from (#6115)one AP MLD in one ESS, where each non-AP STA affiliated with the non-AP MLD being in one BSS and different non-AP STAs affil- iated with the non-AP MLD being in different BSSs, to (#6115)another AP MLD within the same ESS, where each non-AP STA affiliated with the non-AP MLD being(#6115) in another BSS and different non-AP STAs affiliated with the non-AP MLD being in dif- ferent BSSs.
* A non-AP MLD movement from (#6115)one AP MLD in one ESS, where each non-AP STA affiliated with the non-AP MLD being in one BSS and different non-AP STAs affil- iated with the non-AP MLD being in different BSSs, to another BSS(#6115) within the same ESS and being a non-AP STA(#6115), where the MLD MAC address of the non-AP MLD is the same as the MAC address of the non-AP STA(#2236).
* A non-AP STA movement from one BSS(#6115) in one ESS(#6115) to (#6115)an AP MLD within(#5575) the same ESS and being a non-AP MLD(#6115), where each non-AP STA affiliated with the non-AP MLD be in another BSS, different non-AP STAs affiliated with the non-AP MLD being in different BSSs and the MAC address of the non- AP STA is the same as the MLD MAC address of the non-AP MLD(#2236).

A fast BSS transition is a BSS transition that establishes the state necessary for data connectivity before the reassociation rather than after the reassociation.

* ***ESS-transition:*** This type is defined as STA movement from a BSS in one ESS to a BSS in a different ESS. This case is supported only in the sense that the STA might move. Maintenance of upper-layer connections cannot be guaranteed by IEEE Std 802.11; in fact, disruption of service is likely to occur.

***Move the following third paragraph as the first paragraph of this subclause:***

(#2235)The different association services support the different categories of mobility.

**4.5.3.3 Association**

***Change the first three paragraphs as follows:***

To deliver an MSDU within an ESS via the DS, the DS needs to know which AP or AP MLD within the ESS to deliver the MSDU, so that the MSDU might ultimately be delivered to the addressed IEEE 802.11 non-AP(#7401) STA or non-AP MLD(#1000). This information is provided to the DS by the concept of association. Association is necessary, but not sufficient, to support BSS-transition mobility. Association is sufficient to support no- transition mobility. Association is one of the services in the DSS.

Before a non-AP(#7401) STA or a non-AP MLD is allowed to ~~send~~deliver(#2118) an MSDU via an AP or an AP MLD, respectively, it first becomes associated with the AP or the AP MLD, respectively.

(#2238)Association between two STAs is called STA association. Association between a non-AP MLD and an AP MLD is called MLD association.

For a non-GLK STA that is not affiliated with an MLD, the act of becoming associated with an AP invokes the association service (STA association), which provides the STA to AP mapping to the DS. For a non-AP MLD, the act of becoming associated with an AP MLD invokes the association service (MLD association see 11.3 (Authentication and association)(#6111)), which provides the non-AP MLD to AP MLD mapping to the DS(#6111). How the information provided by the association service is stored and managed within the DS is not specified by this standard.

***Change the fifth paragraph as follows:***

Within a robust security network (RSN), association is handled differently. In an RSNA, the IEEE 802.1X Port determines when to allow data traffic across an IEEE 802.11 link between two STAs or multiple IEEE 802.11 links between two MLDs(#2263). A single IEEE 802.1X Port maps to one association, and each association maps to an IEEE 802.1X Port. An IEEE 802.1X Port consists of an IEEE 802.1X Controlled Port and an IEEE 802.1X Uncontrolled Port. The IEEE 802.1X Controlled Port is blocked from passing general data traffic between two STAs or between two MLDs until an IEEE 802.1X authentication procedure completes successfully over the IEEE 802.1X Uncontrolled Port. Once the AKM completes successfully, data protection is enabled to prevent unauthorized access, and the IEEE 802.1X Controlled Port unblocks to allow protected data traffic. IEEE 802.1X Supplicants and Authenticators exchange protocol information via the IEEE 802.1X Uncontrolled Port. It is expected that most other protocol exchanges use the IEEE 802.1X Controlled Ports. However, a given protocol might need to bypass the authorization function and make use of the IEEE 802.1X Uncontrolled Port.

***Change the seventh, eighth, and ninth paragraphs as follows:***

(#3006)At any given instant, a non-AP STA is associated with no more than one AP, and a non-AP MLD is associated with no more than one AP MLD. This allows the DS to determine a unique answer to the questions, “Which AP is serving non-AP STA X?” and “Which AP MLD is serving non-AP MLD X?” Once a(#4840) non-AP(#7401) STA association is completed, a non-AP STA can make full use of a DS (via the AP) to communicate. Similarly, once an MLD association is completed a non-AP MLD can make full use of a DS (via the AP MLD) to communicate. STA ~~A~~association is always initiated by the non-AP STA, not the AP. MLD association is always initiated by the non-AP MLD, not the AP MLD.

An AP or an AP MLD might be associated with many non-AP(#7401) STAs or non-AP MLDs, respectively, at the same time.

A non-AP(#7401) STA or a non-AP MLD learns what APs or AP MLDs, respectively, are present and what operational capabilities are available from each of those APs or AP MLDs and APs affiliated with each AP MLD(#2900), respectively, and then invokes the association service to establish a~~n~~ STA or an MLD associ- ation, respectively. A FILS STA is able to discover, authenticate and associate with the AP with a reduced number of frame transmissions. For details of how a STA learns about what APs are present, see 11.1.4 (Acquiring synchronization, scanning).

**4.5.3.4 Reassociation**

***Change the first paragraph as follows:***

Association is sufficient for no-transition MSDU delivery between IEEE 802.11 STAs or MLDs. Additional functionality is needed to support BSS-transition mobility. The additional required functionality is provided by the reassociation service. Reassociation is one of the services in the DSS.

***Change and split the second paragraph as follows:***

(#1762)(#2091)(#3415)The reassociation service (see 11.3.6 (Association, reassociation, and disassociation)) is invoked to “move”:

* a current STA association (see [4.5.3.3 (Association)](#bookmark1) and 11.3 (Authentication and association)(#7505) ) of a non-AP STA from one AP to the same AP or another AP.
* or a current MLD association (see [4.5.3.3 (Association)](#bookmark1) and 11.3 (Authentication and association)(#7505)) of a non-AP MLD from one AP MLD to the same AP MLD or another AP MLD
* or a current STA association of a non-AP STA with an AP to an MLD association of a non-AP MLD with an AP MLD, where the MAC address of the non-AP STA is the same as the MLD MAC address of the non-AP MLD
* or a current MLD association of a non-AP MLD with an AP MLD to a STA association of a non-AP STA with an AP, where the MLD MAC address of the non-AP MLD is the same as the MAC address of the non-AP STA.

In an ESS with a DS, the reassociation service informs the DS of the current mapping between AP and non-AP(#7401) STA or between AP MLD and non-AP MLD ~~as the STA moves from BSS to BSS within the ESS~~. For a general link in an IEEE 802.1Q network, the reassociation service informs higher layer services how the link is reconfigured, commonly, with which BSS the GLK non-AP STA is a member of. The higher layer services will then destroy, disable, or maintain the existing Internal Sublayer Service SAPs, create or enable new Internal Sublayer Service SAPs, inform the GLK convergence function of the reconfigured general link mapping of the Internal Sublayer Service SAPs, and inform the network routing protocol of the updated general link. The GLK AP and GLK non-AP STA each then establish or maintain a service\_access\_point\_identifier for the reconfigured general link, for their respective MS SAPs. Reassociation also enables changing association attributes of an established association while the non-AP STA or non-AP MLD remains associated with the same AP or the same AP MLD, respectively. Reassociation is always initiated by the non-AP STA or the non-AP MLD.

***Change the last paragraph as follows:***

Only the fast BSS transition facility can move an RSNA during reassociation. Therefore, if FT is not used, the old RSNA is deleted and a new RSNA is constructed.

**4.5.3.5 Disassociation**

***Change the second paragraph as follows:***

For a non-GLK STA that is not affiliated with an MLD, the act of becoming disassociated invokes the disassociation service, which voids any existing non-AP(#7401) STA to AP mapping known to the DS, for the disassociating non-AP(#7401) STA. For a non-AP MLD, the act of becoming disassociated invokes the disassociation service, which voids any existing non-AP MLD to AP MLD mapping known to the DS, for the disassociating non-AP MLD (see 35.3.5.3 (Multi-link tear down procedure)).

***Change the fourth, fifth, and sixth paragraphs as follows:***

The disassociation service can be invoked by either party in a STA(#4840) association (non-AP STA or AP, see [4.5.3.3 (Association)](#bookmark1)) or an MLD(#4840) association (non-AP MLD or AP MLD). Disassociation is a notification, not a request. Disassociation cannot be refused by the receiving STA or the receiving MLD except when management frame protection is negotiated and the message integrity check fails.

An AP or an AP MLD can disassociate non-AP(#7401) STAs or non-AP MLDs, respectively, to enable the AP or the AP MLD to be removed from a network for service or for other reasons.

STAs or MLDs attempt to disassociate when they leave a network. However, the MAC protocol does not depend on STAs or MLDs invoking the disassociation service. (MAC management is designed to accommodate loss of communication with an associated STA or an associated MLD.)